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EXERCISES.

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FIND the locus of the instantaneous centre of a tangent to a parabola when one point of the tangent moves in the tangent at the vertex.

[*De Volson Wood.*]

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SHOW that the equation to the tangent cone from (x', y', z') to $b^2c^2x^2 + a^2c^2y^2 + a^2b^2z^2 - a^2b^2c^2 = 0$, may be written

$$b^2c^2(x - x')^2 + a^2c^2(y - y')^2 + a^2b^2(z - z')^2 = a^2(yz' - y'z)^2 + b^2(xz' - x'z)^2 + c^2(xy' - x'y)^2.$$

[*R. H. Graves.*]

159

FIND the centre of gravity of the loop of the Folium of Descartes.

[*R. H. Graves.*]

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SHOW that the circles of curvature at the node of the Folium of Descartes pass through the middle point of the arc of the loop.

[*R. H. Graves.*]

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THE n th pedal of the curve $F(r, p) = 0$, has for its equation

$$F\left(\frac{r^{n+1}}{p^n}, \frac{r^n}{p^{n-1}}\right) = 0.$$

[*R. H. Graves.*]

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A BODY is projected at an angle of 30° with the horizon, with a given velocity. Determine the constant resistance it must suffer in the direction contrary to its motion in order that it may come to rest when it returns to the horizontal plane whence it started. Also determine the horizontal range, time of flight, and length of trajectory.

[*Jas. M. Ingalls.*]

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AN elliptic plate of semi-axes a and b , thickness c , and density δ , is revolved at an angular velocity \mathcal{Q} , about a line parallel to its minor axis, and at a fixed distance from it, in a plane through this axis perpendicular to the plane of the plate. Find the straining action on the plate along the line of its minor axis; and the greatest safe value of \mathcal{Q} , if σ be the admissible stress for unit of area on the material of the plate.

[*Jas. S. Miller.*]